

What is claimed is:

1. A method for determining the rate of received data in a variable-rate communications system, the method comprising the steps of:

(a) pre-decoding the received data at receivable data rates and detecting quality information of the data pre-decoded at the respective data rates; and

(b) estimating the rate of the received data based on the quality information of the data pre-decoded at the respective data rates.

2. The method of claim 1, wherein a generating function for the pre-decoding in the step (a) is the inverse function of a generating function used for encoding.

3. The method of claim 1, wherein the quality information is a symbol error rate.

4. The method of claim 1, further comprising the step of © Viterbi decoding only the data which corresponds to the estimated data rate.

5. A method for determining the rate of data received by a receiver in a variable-rate communications system, the method comprising the steps of:

(a) pre-decoding the received data at a first data rate and re-encoding the result to output a first quality indication;

(b) comparing the received data to the first quality indication, and counting the number of errors according to the comparison result to output an error metric with respect to the first data rate;

© pre-decoding the received data at a second data rate and re-encoding the result to output a second quality indication;

(d) comparing the received data to the second quality indication, and counting the number of errors according to the comparison result to output an error metric with respect to the second data rate; and

13 (e) estimating the rate of the received data by the error metrics with respect to  
14 the first and second data rates.

1 6. The method of claim 5, further comprising the step of (f) selecting the  
2 data corresponding to the estimated data rate and Viterbi decoding the selected data.

1 7. The method of claim 5, wherein a generating function for pre-decoding  
2 has the inverse function of a generating function for encoding.

1 8. The method of claim 5, further comprising the steps of:  
2 (f) pre-decoding the received data at a third data rate and re-encoding the  
3 result to output a third quality indication; and  
4 (g) comparing the received data to the third quality indication, and counting the  
5 number of errors according to the comparison result to output an error metric with  
6 respect to the third data rate,

7 wherein the error metric with respect to the third data rate is also compared in  
8 the estimation of the data rate in the step (e).

9 9. The method of claim 8, further comprising the steps of:  
10 (h) pre-decoding the received data at a fourth data rate and re-encoding the  
11 result to output a fourth quality indication; and  
12 (g) comparing the received data to the fourth quality indication, and counting  
13 the number of errors according to the comparison result to output an error metric with  
14 respect to the fourth data rate,

1 wherein the error metric with respect to the fourth data rate is also compared  
2 in the estimation of the data rate in the step (e).

1 10. An apparatus for determining the rate of received data in a variable-rate  
2 communications system, the apparatus comprising:

3 a first means for pre-decoding the received data at receivable data rates and

4 providing quality information of the data pre-decoded at the respective data rates; and  
5 a second means for estimating the rate of the received data based on the  
6 quality information of the data pre-decoded at the respective data rates.

1 11. The apparatus of claim 10 wherein the quality information is a symbol  
2 error rate.

1 12. The apparatus of claim 10, further comprising a Viterbi decoder for  
2 Viterbi decoding only the data which corresponds to the estimated data rate.

1 13. An apparatus for determining the rate of data received by a receiver in a  
2 variable-rate communications system, the apparatus comprising:

3 a first pre-decoder for pre-decoding the received data having a first data rate;  
4 a first encoder for re-encoding the output from the first pre-decoder;  
5 a first comparator for comparing the data having the first data rate to the  
6 output from the first encoder;  
7 a first counter for counting the comparison result of the first comparator;  
8 a second pre-decoder for pre-decoding the received data having a second data  
9 rate;  
10 a second encoder for re-encoding the output from the second pre-decoder;  
11 a second comparator for comparing the data having the second data rate to  
12 the output from the second encoder;  
13 a second counter for counting the comparison result of the second comparator;  
14 and  
15 a decision unit for deciding the rate of the received data using the outputs from  
16 the first and second counters and generating selection information.

1 14. The apparatus of claim 13, further comprising a first pre-processing unit  
2 in front of the second pre-decoder.

1 15. The apparatus of claim 14, wherein the first pre-processing unit is  
2 constructed of a summer, a combiner or a selector.

1 16. The apparatus of claim 13, further comprising:  
2 a third pre-decoder for pre-decoding the data having a third data rate;  
3 a third encoder for re-encoding the output from the third pre-decoder;  
4 a third comparator for comparing the data having the third data rate to the  
5 output from the third encoder; and  
6 a third counter for counting the comparison result of the third comparator;  
7 wherein the output from the third counter is also applied to the decision unit.

1 17. The apparatus of claim 16, further comprising a first pre-processing unit  
2 in front of the second pre-decoder.

1 18. The apparatus of claim 17, further comprising a second pre-processing  
2 unit in front of the third pre-decoder.

1 19. The apparatus of claim 18, wherein the first and second pre-processing  
2 units are constructed of a summer, a combiner or a selector.

1 20. The apparatus of claim 16, further comprising:  
2 a fourth pre-decoder for pre-decoding the data having a fourth data rate;  
3 a fourth encoder for re-encoding the output from the fourth pre-decoder;  
4 a fourth comparator for comparing the data having the fourth data rate to the  
5 output from the fourth encoder; and  
6 a fourth counter for counting the comparison result of the fourth comparator;  
7 wherein the output from the fourth counter is also applied to the decision unit.

1 21. The apparatus of claim 20, wherein generating functions used in the first  
2 through fourth pre-decoders have the inverse function of a generating function for

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encoding.

22. The apparatus of claim 20, further comprising a first pre-processing unit in front of the second pre-decoder.

23. The apparatus of claim 22, further comprising a second pre-processing unit in front of the third pre-decoder.

24. The apparatus of claim 23, further comprising a third pre-processing unit in front of the fourth pre-decoder.

25. The apparatus of claim 24, wherein the first, second and third pre-processing units are constructed of a summer, a combiner or a selector.

26. The apparatus of claim 24, further comprising:  
a selector for selecting one of the outputs from the first, second and third pre-processing units according to the selection information; and  
a Viterbi decoder for Viterbi decoding only the output from a pre-processing unit, selected by the selector.

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